Surface Specific Spectroscopy of Polymers Developed

Structure of Polymer Chains Observed

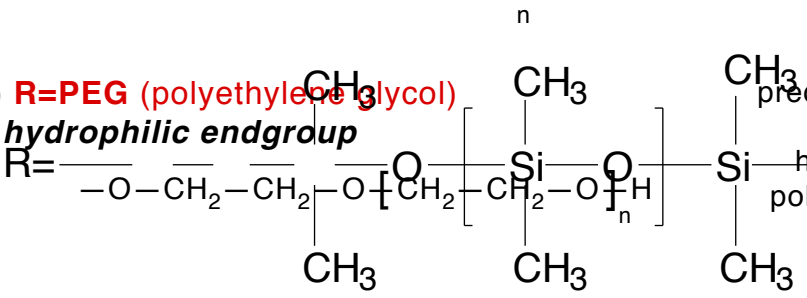
R——*polyurethane backbone*——R

BioSpan polymers have a common polyurethane-based backbone with different end groups, R, which are chosen to tailor the surface properties. Although the endgroups are typically 3% or less of the polymer by weight, they can have a disproportionally large effect on the surface properties.

BioSpan-N (BN) **R=H**
hydrophilic endgroup

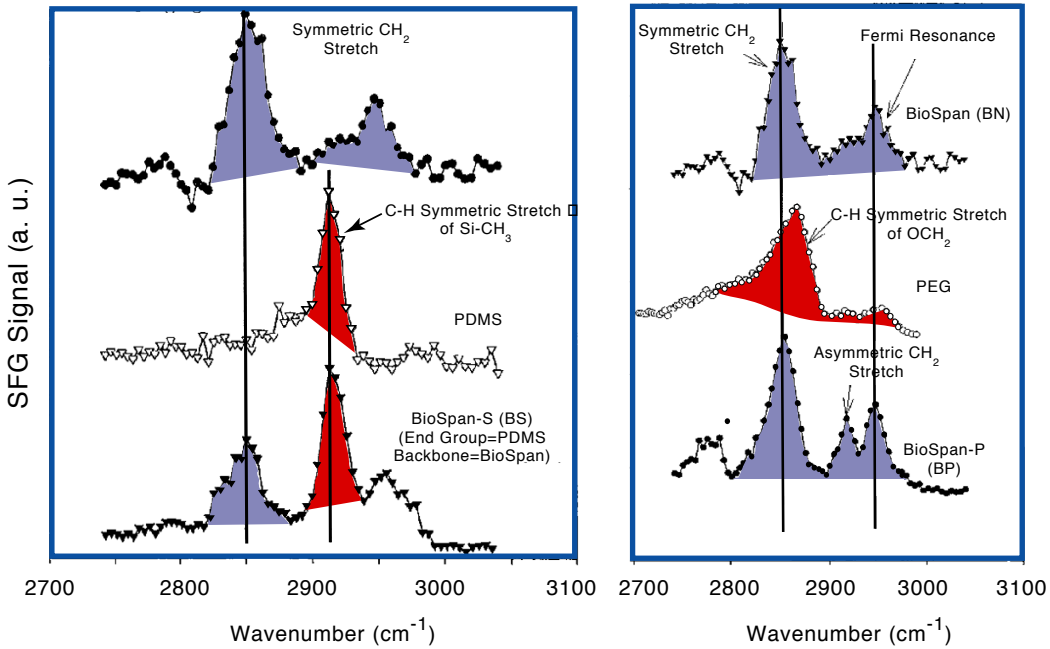
BioSpan-S (BS) **R=PDMS** (polydimethylsiloxane)
hydrophobic endgroup

BioSpan-P (BP) **R=PEG** (polyethylene glycol)
strongly hydrophilic endgroup



Hydrophobic endgroups observed at surface in air

Hydrophillic endgroups are buried in the bulk



Surface specific sum frequency generation (SFG) of BioSpan polymers in air. At left (top to bottom), spectra of the backbone only, hydrophobic PDMS endgroups only, and the BioSpan-S polymer.The hydrophobic endgroup peaks (red) predominate in the BS spectrum thus, they segregate to, and nearly completely cover, the surface. At right, BN (backbone only) hydrophillic PEG endgroups (red features), and the BioSpan-P polymer. Here, the hydrophilic endgroups do not segregate to the surface; the surface properties are determined by the more hydrophobic backbone.

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